CLAIMS

1. Method for manufacturing a glass preform by depositing an aerosol stream of glass particles onto a target, which comprises:
   - supplying a first gaseous or vapor phase composition disposed to provide a hydrolyzable glass precursor to an inlet zone of a reaction chamber;
   - supplying water as a second gaseous or vapor phase composition to said inlet zone of the reaction chamber;
   - reacting the water and the first gaseous or vapor phase composition in the reaction chamber to form an aerosol of glass particles;
   - directing the aerosol along said chamber and through an outlet of said chamber onto a target on which the preform is formed; and
   - depositing the aerosol on the target,

   characterized in that a temperature gradient is provided inside of said chamber, said temperature gradient being such that the temperature increases from said inlet zone to said outlet of the reaction chamber.

2. Method ~~according to claim 1 wherein~~ a difference of temperature of at least about 100°C is provided from said inlet ~~zone~~ to said outlet of the reaction chamber.

3. Method according to claim 2 wherein said difference of temperature is of about 300°C.

4. Method according to claim 1 wherein the first and the second gaseous or vapor phase ~~composition~~ are supplied to the chamber at a predetermined temperature.

5. Method according to claim 4 wherein said predetermined temperature is a temperature at which the hydrolysis reaction between the two compositions is substantially incomplete.

6. Method according to claim 5 wherein said predetermined temperature is lower than about 800°C.
7. Method according to claim 5 wherein said predetermined temperature is from about 600°C to about 750°C.
8. Method according to claim 1 wherein the temperature of the aerosol stream being directed through the reaction chamber increases from about 700°C at the inlet to about 1200°C at the outlet of said chamber.
9. ~~Method according to claim 1 wherein the target preform is~~ maintained at a temperature higher than about ~~700°C.~~
10. Method according to claim 1 wherein the target preform is maintained at a temperature which is lower than the temperature of the aerosol stream impacting on said preform.
11. Method according to claim 1 wherein the temperature of the target preform is at least 100°C less than the temperature of the aerosol stream impacting on said preform.
12. Method according to claim 1 wherein the aerosol stream is directed towards the target by using a reactor having convergent walls.
13. Method according to claim 1 wherein the water and the first gaseous or vapor phase composition are reacted in the substantial absence of an unreactive carrier gas.
14. Method according to claim 1 wherein the first and the second gaseous or vapor phase composition are obtained by separately heating under pressure the said first and second composition each contained as pure liquid into a respective supply tank.
15. Apparatus for forming an elongated glass optical preform comprising:
    - a target onto which glass is deposited to form a preform;

- an injection system for supplying a first gaseous or vapor phase composition and gaseous or vapor phase water to an inlet zone of a reaction chamber;
- a reaction chamber in which the gaseous or vapor phase water and the first gaseous or vapor phase composition are reacted an aerosol of glass, said reaction chamber being provided with an outlet through which the aerosol of glass is directed toward the target;
- a heating system associated with said reaction chamber, said heating system providing a temperature gradient inside said chamber, said temperature gradient being such that the temperature increases from said inlet zone to said outlet of the reaction chamber.

16. Apparatus according to claim 15 wherein the injection system comprises at least two nozzles with an elongated cross-section through which reactants are fed into the reaction chamber.
17. Apparatus according to claim 16 wherein the nozzles are provided with a longitudinal opening of from about 1 mm to about 4 mm.
18. Apparatus according to claim 16 comprising an array of nozzles disposed parallel to each other, which are subsequently activated as the diameter of the target preform increases.
19. Apparatus according to claim 15 wherein said reaction chamber has a convergent cross section.

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